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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/196,347    11/19/98    BROWN    S    33536US1

IM22/0329

EXAMINER

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ART UNIT	PAPER NUMBER
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1764

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DATE MAILED: 03/29/00

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.  
**09/196,347**

Applicant  
**Brown et al.**

Examiner  
**Nadine Preisch**

Group Art Unit  
**1764**



☒ Responsive to communication(s) filed on Nov 19, 1998

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 36-67 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 36-67 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_.

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☒ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 3

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 1764

## **DETAILED ACTION**

### ***Claim Rejections - 35 U.S.C. § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 38, 39, 40, 41, 44, 46, 48 and 51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Claim 38 is indefinite because it is dependent upon a canceled claim. Claim 38 is treated as if it were dependent upon claim 36 because it appears as if applicants intend to further limit claim 36.

### ***Claim Rejections - 35 U.S.C. § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 1764

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 36, 47, 49, 50, 52, 53, 58 and 65 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Sarrazin et al.(5,364,998).

Applicants are claiming several processes for the hydrogenation of unsaturated compounds. The processes involve contacting a feed with a catalyst comprising palladium, an inorganic support and a selectivity enhancer as defined in claims 36, 52 and 58. The dependent claims contain limitations directed at a gallium selectivity enhancer and palladium/selectivity enhancer amounts.

The reference of Sarrazin et al.(5,364,998) discloses a process for the selective hydrogenation of highly unsaturated compounds such as acetylene compounds and diolefins contained in a monoolefin feed. See abstract, lines 1-2, column 1, lines 41-43 and column 6, lines 46-47. The catalyst comprises palladium, gallium and a support such as silica or alumina. See column 1, lines 56-58 and column 2, lines 1-2. Sarrazin et al.(5,364,998) discloses an example where a palladium/gallium/alumina catalyst is contacted with a feed to hydrogenate a highly saturated feed in the form of butadiene (butadiene = diolefin). See column 4, lines 1-50. The

Art Unit: 1764

amount of palladium is 0.2 to 5% weight and the amount of gallium is 0.1 to 5% weight. See column 1, lines 56-61 and 63-67.

The reference of Sarrazin et al.(5,364,998) succeeds at disclosing a process for the hydrogenation of highly unsaturated hydrocarbons which involves the use of a catalyst containing components corresponding to applicants' palladium, gallium and support. In addition, the reference succeeds at disclosing palladium/gallium amounts that are within the component amounts/ratios claimed by applicants.

It is noted that the reference does not refer to gallium as a "selectivity enhancer". However, gallium is considered to inherently function as a selectivity enhancer because the same gallium containing catalyst is contacted with the same unsaturated feed claimed by applicants and would therefore accomplish the same function of "selectivity enhancing". In addition, the reference's palladium/selectivity enhancer amount is considered to meet applicants' limitation of "a sufficient amount to effect a selective hydrogenation of a highly unsaturated compound" because the disclosed process accomplishes the selective hydrogenation of a highly unsaturated compound.

Applicants' hydrogenation process is anticipated by the reference of Sarrazin et al.(5,364,998) because it discloses contacting a highly unsaturated feed with the same catalyst claimed by applicants.

Art Unit: 1764

In addition, the presently claimed catalyst component property of "selectivity enhancing" would obviously have been provided one the Sarrazin et al.(5,364,998) catalyst is provided in the disclosed process.

***Claim Rejections - 35 U.S.C. § 102/103***

Claims 36, 43, 49, 50, 52, 53, 58 and 66 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Trinh Dinh et al.(4,504,593).

Applicants are claiming several processes for the hydrogenation of unsaturated compounds. The processes involve contacting a feed with a catalyst comprising palladium, an inorganic support and a selectivity enhancer as defined in claims 36, 52 and 58. The dependent claims contain limitations directed at a lead selectivity enhancer and palladium/selectivity enhancer amounts.

The reference of Trinh Dinh et al.(4,504,593) discloses an example and catalyst for the hydrogenation of a highly saturated compound in the form of an acetylenic compound and/or olefinic compound. See abstract, lines 1-4 and column 4, lines 35-59. The catalyst includes a palladium component, a component selected from lead or tin, and a carrier such as silica or alumina. See column 1, lines 45, 56-60 and 64-66. The reference discloses an example with 0.27% palladium (Pd) and 0.30% lead (Pb). See column 4, line 46.

Art Unit: 1764

The reference of Trinh Dinh et al.(4,504,593) succeeds at disclosing a process for the hydrogenation of highly unsaturated hydrocarbons which involves the use of a catalyst containing components corresponding to applicants' palladium, tin, lead and support. In addition, the reference also discloses an example with palladium/lead amounts within applicants' claimed ranges for palladium and selectivity enhancer amounts.

It is noted that the reference does not refer to tin and lead as "selectivity enhancers". However, the tin and lead components are considered to inherently function as a selectivity enhancers because the same tin or lead containing catalyst is contacted with the same unsaturated feed claimed by applicants and would therefore accomplish the same function of "selectivity enhancing". In addition, the reference's palladium/selectivity enhancement amount is considered to meet applicants' limitation of "a sufficient amount to effect a selective hydrogenation of a highly unsaturated compound" because the disclosed process accomplishes the selective hydrogenation of a highly unsaturated compound.

Applicants' hydrogenation process is anticipated by the reference of Trinh Dinh et al.(4,504,593) because it discloses contacting a highly unsaturated feed with the same catalyst claimed by applicants.

In addition, the presently claimed catalyst component property of "selectivity enhancing" would obviously have been provided once the Trinh Dinh et al.(4,504,593) catalyst is provided in the disclosed process.

Art Unit: 1764

***Claim Rejections - 35 U.S.C. § 103***

Claims 36-46, 49-53, 55-64 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,173) in view of Lindlar et al.(3,715,404).

Applicants are claiming several processes for the hydrogenation of unsaturated compounds. The processes involve contacting a feed with a catalyst comprising palladium, an inorganic support and a selectivity enhancer as defined in claims 36, 52 and 58. The dependent claims contain limitations directed at specific catalyst component combinations and component amounts.

The reference of Cheung et al.(5,475,173) discloses a selective hydrogenation process for a highly saturated hydrocarbon in the form of C<sub>4</sub>-C<sub>10</sub> diolefins (e.g. dienes). See column 1, lines 46-54. The feed also contains mono-olefins such as 1-butene. See column 3, line 55. Cheung et al.(5,475,173) also teaches that the feed contains added hydrogen. See column 4, lines 20-25. The process involves contacting the hydrocarbon feed with a catalyst containing palladium, silver and an alkali metal halide in the form of an alkali metal fluoride. See column 1, lines 59-64. The palladium is present in an amount of 0.05 to 0.6 weight percent. See column 2, lines 3. Cheung et al.(5,475,173) teaches that the catalyst support is selected from alumina, silica or zinc aluminate (zinc aluminate = spinel). See column 1, lines 64-66.

The reference of Cheung et al.(5,475,173) succeeds at disclosing a hydrogenation process for saturated hydrocarbons involving the use of a catalyst with components corresponding to applicants' palladium, silver and alkali metal fluoride components. The reference also succeeds at



Art Unit: 1764

disclosing palladium amounts overlapping those claimed by applicants as well as the use of a feed containing hydrogen.

Several differences are noted between the reference of Cheung et al.(5,475,173) and applicants' claimed invention. The reference does not disclose applicants' claimed selectivity enhancers or selectivity enhancer amounts.

The reference of Lindlar et al.(3,715,404) is cited for the general teaching that it is well known in the art that lead, bismuth, cadmium, tin, thorium and/or mercury enhance the activity of palladium catalysts which are utilized in selective hydrogenation processes. See column 1, lines 11-26.

Since Cheung et al.(5,475,173) discloses a selective hydrogenation process, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the palladium containing catalyst to include lead, bismuth, tin, thorium, mercury and/or cadmium because the reference of Lindlar et al.(3,715,404) teaches that lead, bismuth, tin, thorium, mercury and/or cadmium are known selectivity enhancers for palladium hydrogenation catalysts. One of ordinary skill would have been motivated to add lead, bismuth, tin, thorium, mercury and/or cadmium to the Cheung palladium catalyst because such components have the benefit of enhancing selective hydrogenation.

In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add any amount of selectivity enhancer required to achieve a desired level of hydrogenation, including the amounts claimed by applicants, because there is no invention

Art Unit: 1764

where the difference in proportions is not critical and is ascertained by routine experimentation since the determination of workable ranges is not considered to be inventive. In re Swain and Adams, 70 USPQ 412 (CCPA 1946).

***Claim Rejections - 35 U.S.C. § 103***

Claims 54 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,773) in view of Lindlar et al.(3,715,404) as applied to claims 36-46, 49-53, 55-64 and 66 above, and further in view of Collins (4,126,645).

A difference is noted between the modified teachings of Cheung et al.(5,475,773) and applicants' claimed invention. The teachings do not suggest a palladium skin coating as claimed by applicants.

The reference of Collins (4,126,645) is cited for the teaching that palladium supported catalysts with catalyst layers not more than 150 microns ( $\mu\text{m}$ ) accomplish selective hydrogenation at advantageous rates and display long catalyst life between regenerations. See column 1, lines 55-68 and column 2, lines 1-3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to distribute palladium in a thickness of less than 150 $\mu\text{m}$  on the modified Cheung et al.(5,475,173) catalyst because the reference of Collins (4,126,645) teaches that palladium distributed in a thickness of less than 150 $\mu\text{m}$  advantageously increases the selective hydrogenation rate and increases the catalyst life between regenerations.

Art Unit: 1764

***Claim Rejections - 35 U.S.C. § 103***

Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cheung et al.(5,475,773) in view of Lindlar et al.(3,715,404) as applied to claims 36-46, 49-53, 55-64 and 66 above, and further in view of Sarrazin et al.(5,364,998).

A difference is noted between the modified Cheung et al.(5,475,773) catalyst and applicants' claimed invention. The modified teachings do not suggest a gallium component.

The reference of Sarrazin et al.(5,364,998) discloses a process for the selective hydrogenation of highly unsaturated compounds such as acetylene compounds and diolefins contained in a monoolefin feed. See abstract, lines 1-2, column 1, lines 41-43 and column 6, lines 46-47. The catalyst comprises palladium, gallium and a support such as silica or alumina. See column 1, lines 56-58 and column 2, lines 1-2. Sarrazin et al.(5,364,998) discloses an example where a palladium/gallium/alumina catalyst is contacted with a feed to hydrogenate a highly saturated feed in the form of butadiene (butadiene = diolefin). See column 4, lines 1-50. The amount of palladium is 0.2 to 5% weight and the amount of gallium is 0.1 to 5% weight. See column 1, lines 56-61 and 63-67. The example illustrates that a palladium catalyst containing gallium selectively hydrogenates a higher percentage of highly unsaturated compounds in the form of butadiene. See column 4, lines 41-45.

The reference of Sarrazin et al.(5,364,998) succeeds in illustrating that gallium enhances the selective hydrogenating ability of palladium.

Art Unit: 1764

Since the modified teachings of Cheung et al.(5,475,773) include a palladium component, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a gallium component to the palladium catalyst because the reference of Sarrazin et al.(5,364,998) illustrates that gallium enhances the selective hydrogenating ability of palladium. One of ordinary skill would have been motivated to add gallium to a palladium catalyst because such a component desirably increases the degree of selective hydrogenation.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

a timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. a terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 36-41, 43-46, 49, 58, 59, 60, 61, 64 and 66 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 12, 18, 19, 20, 24, 28, 34 and 35 of copending Application No.09/459,846 in view of Lindlar et al.(3,715,404).

This is a provisional obviousness-type double patenting rejection.

Art Unit: 1764

The present application and copending Application No. 09/459,846 both contain claims drawn to hydrogenating an unsaturated hydrocarbon in the presence of a catalyst containing a palladium component, a silver component, a support and an alkali metal halide component.

A difference is noted between the present claims and the claims of Application No. 09/459,846. The claims of Application No. 09/459,846 do not contain limitations directed at selectivity enhancers.

The reference of Lindlar et al.(3,715,404) is cited for the general teaching that it is well known in the art that lead, bismuth, cadmium, tin, cadmium, thorium and/or mercury enhance the activity of palladium catalysts which are utilized in selective hydrogenation processes. See column 1, lines 11-26.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the claims of 09/459,846 which define a palladium containing catalyst to include lead, bismuth, tin, thorium, mercury and/or cadmium because the reference of Lindlar et al.(3,715,404) teaches that lead, bismuth, tin, thorium, mercury and/or cadmium are known selectivity enhancers for palladium hydrogenation catalysts. One of ordinary skill would have been motivated to add lead, bismuth, tin, thorium, mercury and/or cadmium to the claimed palladium catalyst because such components have the benefit of enhancing selective hydrogenation.

Art Unit: 1764

***Prior Art of Record***

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure.

The attached references are cited to show the relative state of the art with respect to hydrogenations involving supported palladium catalysts.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nadine Preisch whose telephone number is (703) 305-2667. The examiner can normally be reached on Monday through Thursday from 7:30 am to 6:00 pm.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

March 19, 2000

N.P.

*N. P.*

NADINE PREISCH  
ART UNIT 1764  
*Nadi Preisch*